AMENDMENT

Amendments to the Claims

The listing of claims presented below replaces all prior versions, and listings, of claims in the application.

The Applicant wishes to make the following amendments to the claims of the above patent application:

Listing of Claims:

1. (original) A method of identifying a subset of components of a system based on data obtained from the system using at least one training sample from the system, the method comprising the steps of:

obtaining a linear combination of components of the system and weightings of the linear combination of components, the weightings having values based on data obtained from the at least one training sample, the at least one training sample having a known feature;

obtaining a model of a probability distribution of the known feature, wherein the model is conditional on the linear combination of components;

obtaining a prior distribution for the weighting of the linear combination of the components, the prior distribution comprising a hyperprior having a high probability density close to zero, the hyperprior being such that it is based on a combined Gaussian distribution and Gamma hyperprior;

combining the prior distribution and the model to generate a posterior distribution; and

identifying the subset of components based on a set of the weightings that maximise the posterior distribution.

2. (original) The method as claimed in claim 1, wherein the step of obtaining the linear combination comprises the step of using a Bayesian statistical method to estimate the weightings.

3. (previously presented) The method as claimed in claim 2, further comprising the step

of making an apriori assumption that a majority of the components are unlikely to be components that will form part of the subset of components.

4. (previously presented) The method as claimed in claim 3, wherein the hyperprior comprises one or more adjustable parameters that enable the prior distribution near zero to be varied.

5. (previously presented) The method as claimed in claim 4, wherein the model comprise a mathematical equation in the form of a likelihood function that provides the probability distribution based on data obtained from the at least one training sample.

6. (original) The method as claimed in claim 5, wherein the likelihood function is based on a previously described model for describing some probability distribution.

7. (previously presented) The method as claimed in claim 6, wherein the step of obtaining the model comprises the step of selecting the model from a group comprising a multinomial or binomial logistic regression, generalised linear model, Cox's proportional hazards model, accelerated failure model and parametric survival model.

8. (original) The method as claimed in claim 7, wherein the model based on the multinomial or binomial logistical regression is in the form of:

$$L = \prod_{i=1}^{n} \left(\prod_{g=1}^{G-1} \left(\frac{e^{x_i^T b_g}}{1 + \sum_{g=1}^{G-1} e^{x_i^T b_g}} \right)^{e_{ik}} \left(\frac{1}{1 + \sum_{h=1}^{G-1} e^{x_i^T b_h}} \right)^{e_{iG}} \right)$$

9. (original) The method as claimed in claim 7, wherein the model based on the generalised linear model is in the form of:

$$L = \log p(y \mid \beta, \varphi) = \sum_{i=1}^{N} \{ \frac{y_i \theta_i - b(\theta_i)}{a_i(\varphi)} + c(y_i, \varphi) \}$$

10. (original) The method as claimed in claim 7, wherein the model based on the Cox's proportional hazards model is in the form of:

$$l\left(\underset{\sim}{t} \mid \underset{\sim}{\beta}\right) = \prod_{j=1}^{N} \left(\frac{exp\left(Z_j \underset{\sim}{\beta}\right)}{\sum_{i \in \Re_j} exp\left(Z_i \underset{\sim}{\beta}\right)} \right)^{d_j}$$

11. (original) The method as claimed in claim 7, wherein the model based on the Parametric Survival model is in the form of:

$$L = \sum_{i=1}^{N} \left\{ c_i log\left(\mu_i\right) - \mu_i + c_i \left[log\left(\frac{\lambda\left(y_i\right)}{\Lambda\left(y_i; \underset{\sim}{\varphi}\right)} \right) \right] \right\}$$

12. (currently amended) The method as claimed in ~~claim 11~~ **claim 9**, wherein the step of identifying the subset of components comprises the step of using an iterative procedure such that the probability density of the posterior distribution is maximised.

13. (original) The method as claimed in claim 12, wherein the iterative procedure is an EM algorithm.

14. (previously presented) A method for identifying a subset of components of a subject which are capable of classifying the subject into one of a plurality of predefined groups, wherein each group is defined by a response to a test treatment, the method comprising the steps of:

exposing a plurality of subjects to the test treatment and grouping the subjects into response groups based on responses to the treatment;

measuring components of the subjects; and

identifying a subset of components that is capable of classifying the subjects into response groups using the method as claimed in claim 1.

15. (previously presented) An apparatus for identifying a subset of components of a subject, the subset being capable of being used to classify the subject into one of a plurality of predefined response groups wherein each response group, is formed by exposing a plurality of subjects to a test treatment and grouping the subjects into response groups based on the response to the treatment, the apparatus comprising:

an input for receiving measured components of the subjects; and

processing means operable to identify a subset of components that is capable of being used to classify the subjects into response groups using the method as claimed in claim 1.

16. (previously presented) A method for identifying a subset of components of a subject that is capable of classifying the subject as being responsive or non-responsive to treatment with a test compound, the method comprising the steps of:

exposing a plurality of subjects to the test compound and grouping the subjects into response groups based on each subjects response to the test compound;

measuring components of the subjects; and

identifying a subset of components that is capable of being used to classify the subjects into response groups using the method as claimed in claim 1.

17. (previously presented) An apparatus for identifying a subset of components of a subject, the subset being capable of being used to classify the subject into one of a plurality of predefined response groups wherein each response group is formed by exposing a plurality of subjects to a compound and grouping the subjects into response groups based on the response to the compound, the apparatus comprising;

an input operable to receive measured components of the subjects;

processing means operable to identify a subset of components that is capable of classifying the subjects into response groups using the method as claimed in claim 1.

18. (original) An apparatus for identifying a subset of components of a system from data generated from the system from a plurality of samples from the system, the subset

being capable of being used to predict a feature of a test sample, the apparatus comprising:

a processing means operable to:

obtain a linear combination of components of the system and obtain weightings of the linear combination of components, each of the weightings having a value based on data obtained from at least one training sample, the at least one training sample having a known feature;

obtaining a model of a probability distribution of a second feature, wherein the model is conditional on the linear combination of components;

obtaining a prior distribution for the weightings of the linear combination of the components, the prior distribution comprising an adjustable hyperprior which allows the prior probability mass close to zero to be varied wherein the hyperprior is based on a combined Gaussian distribution and Gamma hyperprior;

combining the prior distribution and the model to generate a posterior distribution; and

identifying the subset of components having component weights that maximize the posterior distribution.

19. (original) The apparatus as claimed in claim 18, wherein the processing means comprises a computer arranged to execute software.

20. (previously presented) A computer program which, when executed by a computing apparatus, allows the computing apparatus to carry out the method as claimed in claim 1.

21. (original) A computer readable medium comprising the computer program as claimed in claim 20.

22. (original) A method of testing a sample from a system to identify a feature of the sample, the method comprising the steps of testing for a subset of components that are diagnostic of the feature, the subset of components having been determined by using

the method as claimed in claim 1.

23. (original) The method as claimed in claim 22, wherein the system is a biological system.

24. (previously presented) An apparatus for testing a sample from a system to determine a feature of the sample, the apparatus comprising means for testing for components identified in accordance with the method as claimed in claim 1.

25. (original) A computer program which, when executed by on a computing device, allows the computing device to carry out a method of identifying components from a system that are capable of being used to predict a feature of a test sample from the system, and wherein a linear combination of components and component weights is generated from data generated from a plurality of training samples, each training sample having a known feature, and a posterior distribution is generated by combining a prior distribution for the component weights comprising an adjustable hyperprior which allows the probability mass close to zero to be varied wherein the hyperprior is based on a combined Gaussian distribution and Gamma hyperprior, and a model that is conditional on the linear combination, to estimate component weights which maximise the posterior distribution.

26. (original) A method of identifying a subset of components of a biological system, the subset being capable of predicting a feature of a test sample from the biological system, the method comprising the steps of:

obtaining a linear combination of components of the system and weightings of the linear combination of components, each of the weightings having a value based on data obtained from at least one training sample, the at least one training sample having a known feature;

obtaining a model of a probability distribution of the known feature, wherein the model is conditional on the linear combination of components;

obtaining a prior distribution for the weightings of the linear combination of the components, the prior distribution comprising an adjustable hyperprior which allows the probability mass close to zero to be varied;

combining the prior distribution and the model to generate a posterior distribution; and

identifying the subset of components based on the weightings that maximize the posterior distribution.